

JAPAN

EDICT OF GOVERNMENT

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JIS B 2240 (1984) (English): Copper alloy pipe flanges

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*The citizens of a nation must
honor the laws of the land.*

Fukuzawa Yukichi

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JAPANESE INDUSTRIAL STANDARD

Basic Dimensions of Copper
Alloy Pipe Flanges

JIS B 2240—1984

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JAPANESE INDUSTRIAL STANDARD

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Basic Dimensions of Copper Alloy Pipe Flanges

B 2240-1984

1. Scope

This Japanese Industrial Standard specifies the basic dimensions of copper alloy pipe flanges of nominal pressure of 5 K, 10 K and 16 K connecting pipes and valves which are used for general pipe arrangements of vapor, air, gas, water, oil, etc. (hereinafter referred to as the "flange").

Remark: The units and numerical values given in { } in this standard are in accordance with the International System of Units (SI), and are appended for reference.

2. Relation between States of Fluids and Maximum Working Pressures

The relation between states of fluids and maximum working pressure shall be in accordance with Table 1.

Applicable Standards:

JIS B 1001-Diameter of Bolt Hole and Counterbore

JIS B 2202-Dimensions for Pipe Flange Facing

JIS B 2203-Tolerances for Pipe Flanges

JIS G 3101-Rolled Steel for General Structure

JIS H 3300-Copper and Copper Alloy-Seamless Pipes and Tubes

JIS H 3320-Copper and Copper Alloy-Welded Pipes and Tubes

JIS H 5101-Brass Castings

JIS H 5111-Bronze Castings

Table 1

Unit: MPa {kgf/cm²}

Nominal pressure	State of fluid		Maximum working pressure	Pressure of hydrostatic test (reference) (¹)
5 K	220°C	Vapor, air, gas, oil or pulsating water (accompanied by pressure variations)	0.49 { 5 }	0.98{10}
	185°C max.		0.56 { 6 }	
	Steady flow water at a temperature of not more than 120°C (accompanied by a few pressure variations)		0.69 { 7 }	
10 K	220°C	Vapor, air, gas, oil or pulsating water (accompanied by pressure variations)	0.98{10}	1.96{20}
	185°C max.		1.18{12}	
	Steady flow water at a temperature of not more than 120°C (accompanied by a few pressure variations)		1.37{14}	
16 K	220°C	Vapor, air, gas, oil or pulsating water (accompanied by pressure variations)	1.57{16}	3.14{32}
	185°C max.		1.86{19}	
	Steady flow water at a temperature of not more than 120°C (accompanied by a few pressure variations)		2.16{22}	

Note (¹) This pressure of hydrostatic test is the test pressure in the case where flanges have been fitted with the pipe and is given for reference, except where the pressure otherwise specified.

Remark: Where the temperature or the pressure is in the intermediate range of values in the table, the maximum working pressure or temperature can be determined by interpolation.

3. Dimensions

The dimensions of flanges shall be in accordance with Attached Table 1 to Attached Table 3.

Further, the dimensional tolerances shall be in accordance with JIS B 2203.

4. Materials

The materials which have been taken as the basis of the specification of dimensions shall be as shown in Table 2.

Further, where the materials other than those of Table 2 are used, those materials shall be subjected to the agreement or the conference between the parties concerned to the delivery.

Table 2

Nominal pressure	Solid flange	Slip-on flange ⁽³⁾
5 K	BC2, BC6 ⁽²⁾ and BC7 of JIS H 5111.	YBSc2 ⁽²⁾ ⁽⁴⁾ of JIS H 5101, BC7 ⁽⁵⁾ of JIS H 5111.
10 K		
16 K		

Notes ⁽²⁾ BC6 and YBSc2 are used where the state of fluid is at not more than 205°C.

⁽³⁾ The material of slip-on flange in the case where the pipes are connected by welding shall be in accordance with the agreement or the conference between the parties concerned to the delivery.

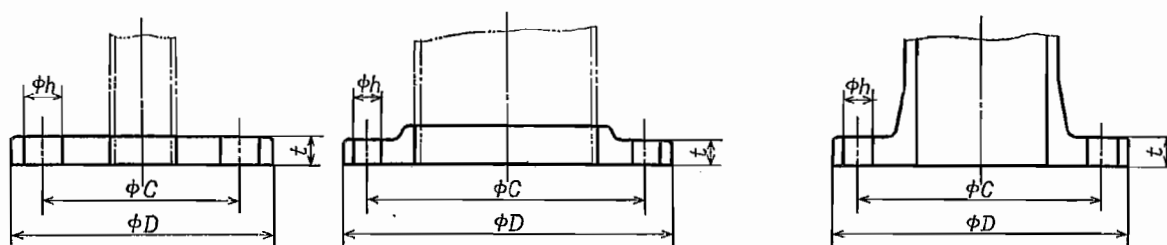
⁽⁴⁾ Pb of YBSc2 should preferably be not more than 1 %.

⁽⁵⁾ Where BC7 is used for slip-on brazing flange, the state of fluid should be over 205°C. Further, Sn and Pb should preferably be not more than 5 to 6 % and 1 % respectively.

Attached Table 1. Basic Dimensions of Flange of Nominal Pressure of 5 K

Slip-on flange

Solid flange



Unit: mm

Nominal diameter	Outside diameter of applied pipe		Outside diameter of flange <i>D</i>	Thickness of flange <i>t</i>	Bolt hole			Nominal designation of screw thread of bolt
	(1)	(2)			Diameter of bolt circle <i>C</i>	Number	Diameter <i>h</i>	
10	16	12, 70	75	9	55	4	12	M 10
15	19	15, 88	80	9	60	4	12	M 10
20	25, 4	22, 22	85	10	65	4	12	M 10
25	31, 8	28, 58	95	10	75	4	12	M 10
32	38, 1	34, 92	115	12	90	4	15	M 12
40	45	41, 28	120	12	95	4	15	M 12
50	50	53, 98	130	14	105	4	15	M 12
65	65, 75	66, 68	155	14	130	4	15	M 12
80	75, 76, 2	79, 38	180	14	145	4	19	M 16
(90)	100	—	190	14	155	4	19	M 16
100	100	104, 78	200	16	165	8	19	M 16
125	125	130, 18	235	16	200	8	19	M 16
150	150	155, 58	265	18	230	8	19	M 16
(175)	150	—	300	18	260	8	23	M 20
200	200	—	320	20	280	8	23	M 20
(225)	200	—	345	20	305	12	23	M 20
250	250	—	385	22	345	12	23	M 20
300	—	—	430	22	390	12	23	M 20
350	—	—	480	24	435	12	25	M 22
400	—	—	540	24	495	16	25	M 22
450	—	—	605	24	555	16	25	M 22
500	—	—	655	24	605	20	25	M 22
(550)	—	—	720	26	665	20	27	M 24
600	—	—	770	26	715	20	27	M 24

Remarks 1. The flanges of a nominal diameter given in parentheses shall not be used as far as possible.

2. The column of outside diameter (1) of applied pipe shows the outside diameter of the representative pipe out of those specified in Table 7(1) of JIS H 3300 and Table 6 of JIS H 3320 and a pipe with an outside diameter other than specified in these tables may be applied. Where the pipe with an outside diameter other than these outside diameters is applied, it shall be subjected to the agreement or the conference between the parties concerned to the delivery. Provided that in all cases of these, the pipe with a larger outside diameter than the inside diameter d_2 of gasket shown in Reference Table 1 and Reference Table 2 shall not be applied.

Further, the column of outside diameter (2) of applied pipe shows the outside diameter of pipe specified in Table 7 (2) of JIS H 3300.

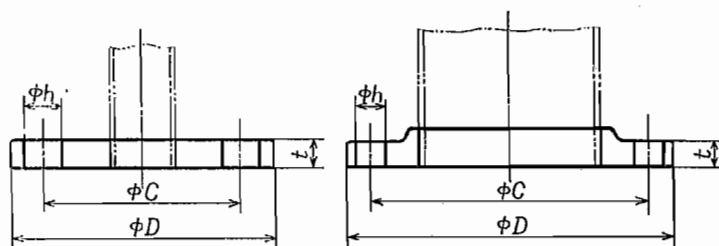
3. The diameter of bolt hole h is in accordance with Grade 3 in JIS B 1001 where the nominal designation of screw thread of bolt is not more than M16.

4. The facing shall be the flat face of JIS B 2202.

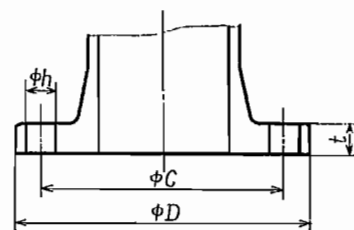
Reference: The materials of bolt and nut to be used for fastening a flange shall be SS41 of JIS G 3101, as a rule.

Attached Table 2. Basic Dimensions of Flange of Nominal Pressure of 10 K

Slip-on flange



Solid flange



Unit: mm

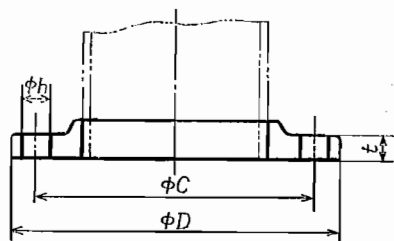
Nominal diameter	Outside diameter of applied pipe		Outside diameter of flange D	Thickness of flange t	Bolt hole			Nominal designation of screw thread of bolt
	(1)	(2)			Diameter of bolt circle C	Number	Diameter h	
10	16	12, 70	90	12	65	4	15	M 12
15	19	15, 88	95	12	70	4	15	M 12
20	25, 4	22, 22	100	14	75	4	15	M 12
25	31, 8	28, 58	125	14	90	4	19	M 16
32	38, 1	34, 92	135	16	100	4	19	M 16
40	45	41, 28	140	16	105	4	19	M 16
50	50	53, 98	155	16	120	4	19	M 16
65	65, 75	66, 68	175	18	140	4	19	M 16
80	75, 76, 2	79, 38	185	18	150	8	19	M 16
(90)	100	—	195	18	160	8	19	M 16
100	100	104, 78	210	18	175	8	19	M 16
125	125	130, 18	250	20	210	8	23	M 20
150	150	155, 58	280	22	240	8	23	M 20
(175)	150	—	305	22	265	12	23	M 20
200	200	—	330	22	290	12	23	M 20
(225)	200	—	350	22	310	12	23	M 20
250	250	—	400	24	355	12	25	M 22
300	—	—	445	24	400	16	25	M 22
350	—	—	490	26	445	16	25	M 22
400	—	—	560	28	510	16	27	M 24
450	—	—	620	30	565	20	27	M 24
500	—	—	675	30	620	20	27	M 24
(550)	—	—	745	32	680	20	33	M 30
600	—	—	795	32	730	24	33	M 30

Remark: See the Remarks 1 to 4 of Attached Table 1. Provided that "where the nominal designation of screw thread of bolt is M30, Grade 2 of JIS B 1001 is applied" shall be appended to Remark 3.

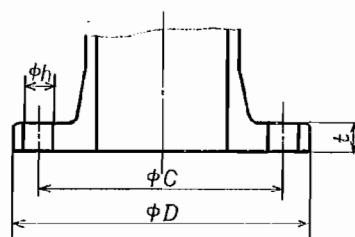
Reference: See Reference of Attached Table 1.

Attached Table 3. Basic Dimensions of Flange of Nominal Pressure of 16 K

Slip-on flange



Solid flange



Unit: mm

Nominal diameter	Outside diameter of applied pipe		Outside diameter of flange D	Thickness of flange t	Bolt hole			Nominal designation of screw thread of bolt
	(1)	(2)			Diameter of bolt circle C	Number	Diameter h	
10	16	12, 70	90	12	65	4	15	M 12
15	19	15, 88	95	12	70	4	15	M 12
20	25, 4	22, 22	100	14	75	4	15	M 12
25	31, 8	28, 58	125	14	90	4	19	M 16
32	38, 1	34, 92	135	16	100	4	19	M 16
40	45	41, 28	140	16	105	4	19	M 16
50	50	53, 98	155	16	120	8	19	M 16
65	65, 75	66, 68	175	18	140	8	19	M 16
80	75, 76, 2	79, 38	200	20	160	8	23	M 20
(90)	100	—	210	20	170	8	23	M 20
100	100	104, 78	225	22	185	8	23	M 20
125	125	130, 18	270	22	225	8	25	M 22
150	150	155, 58	305	24	260	12	25	M 22
200	200	—	350	26	305	12	25	M 22
250	250	—	430	28	380	12	27	M 24
300	—	—	480	30	430	16	27	M 24

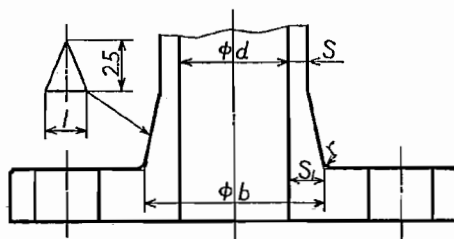
Remark: See Remarks 1 to 4 of Attached Table 1.

Reference: See Reference of Attached Table 1.

Reference

1. The Reference Table 1 shows the inside diameter of solid flange and dimensions of its neck part.

Reference Table 1. Dimensions of Solid Flange



Unit: mm

Nominal diameter	Inside diameter d	Nominal pressure of 5 K					Nominal pressure of 10K				Nominal pressure of 16 K			
		S	S_1	b	r		S	S_1	b	r	S	S_1	b	r
For general use and for ship	10	10	4	7	24	5	4	9	28	5	4	9	28	5
	15	15	4	7	29	5	5	9	33	5	5	9	33	5
	20	20	4	8	36	5	5	10	40	5	5	10	40	5
	25	25	4	8	41	6	5	10	45	6	5	10	45	6
	32	32	5	9	50	6	6	11	54	6	6	11	54	6
	40	40	5	9	58	6	6	11	62	6	6	11	62	6
	50	50	5	10	70	6	6	12	74	6	6	12	74	6
	65	65	5	10	85	6	6	12	89	6	7	13	91	6
	80	80	6	11	102	6	7	13	106	6	8	14	108	6
	(90)	90	6	11	112	6	7	13	116	6	8	15	120	6
	100	100	6	12	124	6	7	14	128	6	9	16	132	6
	125	125	7	12	149	8	8	15	155	8	10	17	159	8
	150	150	7	13	176	8	9	16	182	8	11	19	188	8
	(175)	175	8	14	203	8	10	17	209	8	—	—	—	—
	200	200	8	14	228	8	11	18	236	8	13	21	242	8
	(225)	225	9	15	255	8	12	18	261	8	—	—	—	—
	250	250	9	16	282	8	12	20	290	8	15	24	298	10
	300	300	10	17	334	8	14	21	342	8	17	26	352	10
For general use	350	340	10	18	376	10	15	23	386	10	—	—	—	—
	400	400	11	19	438	10	16	24	448	10	—	—	—	—
	450	450	11	19	488	10	16	24	498	10	—	—	—	—
	500	500	12	21	542	10	17	25	550	10	—	—	—	—
	(550)	550	12	21	592	12	18	27	604	12	—	—	—	—
	600	600	13	21	642	12	20	27	654	12	—	—	—	—
For ship	350	335	10	18	371	10	15	23	381	10	—	—	—	—
	400	380	11	19	418	10	16	24	428	10	—	—	—	—
	450	430	11	19	468	10	16	24	478	10	—	—	—	—
	500	480	12	21	522	10	17	25	530	10	—	—	—	—
	550	530	12	21	572	12	18	27	584	12	—	—	—	—
	600	580	13	21	622	12	20	27	634	12	—	—	—	—

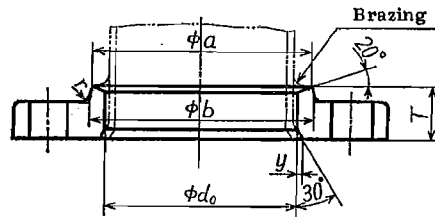
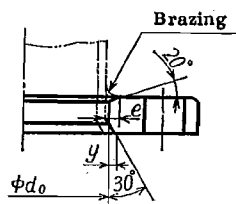
Remark: The flange with a nominal diameter given in parentheses shall not be used as far as possible.

2. The Reference Table 2 shows an example of the diameter of inserting hole of the slip-on brazing flange and the dimensions of hub part and the flared part at the pipe end.

Reference Table 2. Dimensions of Slip-on Brazing Flange

One of nominal pressure of 5 K and nominal diameter 10 to 125 and one of nominal pressure of 10 K and nominal diameter 10 to 100.

One of nominal pressure of 5 K and nominal diameter 150 to 200, one of nominal pressure of 10 K and nominal diameter 125 to 200, and further, one of nominal pressure 16 K.



Unit: mm

Nominal diameter	Outside diameter of applied pipe	Diameter of inserting hole d_0	Nominal pressure of 5K						Nominal pressure of 10K						Nominal pressure of 16 K					
			T	Diameter of hub		r	y	e	T	Diameter of hub		r	y	e	T	Diameter of hub		r	y	
				a	b					a	b					a	b			
10	12, 70	13, 2	—	—	—	—	1, 5	4	—	—	—	—	2	4	20	22	26	4	2	
15	15, 88	16, 4	—	—	—	—	1, 5	4	—	—	—	—	2	4	20	26	30	4	2	
20	22, 22	22, 7	—	—	—	—	1, 5	4	—	—	—	—	2	5	22	33	37	4	2	
25	28, 58	29, 1	—	—	—	—	1, 5	4	—	—	—	—	2	5	22	39	43	4	2	
32	34, 92	35, 4	—	—	—	—	1, 5	5	—	—	—	—	2	5	24	45	49	4	2	
40	41, 28	41, 8	—	—	—	—	1, 5	5	—	—	—	—	2	5	24	52	56	4	2	
50	53, 98	54, 5	—	—	—	—	2	5	—	—	—	—	3	6	26	67	71	6	3	
65	66, 68	67, 2	—	—	—	—	2	5	—	—	—	—	3	6	28	81	85	6	3	
80	79, 38	79, 9	—	—	—	—	2	5	—	—	—	—	3	7	30	95	101	6	3	
100	104, 78	105, 8	—	—	—	—	3	6	—	—	—	—	3	7	32	121	127	6	3	
125	130, 18	131, 2	—	—	—	—	3	6	30	146	152	6	3	—	34	148	154	8	4	
150	155, 58	156, 6	28	168	174	6	3	—	32	172	178	6	3	—	36	176	182	8	4	

Remark: The outside diameter of applied pipe shall be in accordance with the basic outside diameter of copper pipe of Table 7 (2) in JIS H 3300.

3. The classification and dimensions of gaskets are shown in the following:

- (1) Classification of Gaskets The gaskets shall be classified as shown in Reference Table 3 according to the used temperature for the nominal pressure of 5 K, 10 K and 16 K respectively.

Reference Table 3

Used temperature	Classification of gaskets
100°C max.	Rubber sheet gasket ⁽¹⁾ Cloth-inserted rubber sheet gasket ⁽¹⁾ (²)
Over 100°C to 220°C incl.	Asbestos joint sheet gasket ⁽³⁾

Note ⁽¹⁾ Select the rubber material according to the property of fluid.

For instance, use an oil resistant rubber for a fluid of oil system.

⁽²⁾ Do not use for a fluid of gas system.

⁽³⁾ Use a gasket with little leakage due to penetration for a fluid of gas system.

Remark: The gasket of rubber system should preferably be used where the nominal pressure is not more than 10 K and the state of fluid is not higher than 100°C.

- (2) Dimensions of Gasket The dimensions of gasket shall be of the full-face gasket as shown in Reference Table 1 of JIS B 2202.

The thickness of gasket should preferably be 2 mm for rubber sheet gasket and cloth-inserted rubber sheet gasket, and 1.5 mm or 3 mm for asbestos joint sheet gasket.

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